DOCUMENT RESUME

ED 339 400 IR 053 908

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TITLE	Technology and Equity. ERIC Digest.
INSTITUTION	ERIC Clearinghouse on Information Resources, Syracuse, N.Y.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO	EDO-IR-91-8
PUB DATE	Dec 91
CONTRACT	RI88062008
NOTE	4p.
AVAILABLE FROM	ERIC Clearinghouse on Information Resources, Syracuse University, 030 Huntington Hall, Syracuse, NY 13244-2340 (free while supply lasts).
PUB TYPE	Information Analyses - ERIC Clearinghouse Products (071)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Academic Aptitude; Computers; Economic Factors; Educationally Disadvantaged; Elementary Secondary Education; *Equal Education; Information Technology; *Microcomputers; Physical Disabilities; Sex Stereotypes; *Technological Advancement
IDENTIFIERS	ERIC Digests

ABSTRACT

This examination of the relationship that exists between technology and students warns that, although technology is routinely touted as a potentially powerful agent of educational reform, technology and equity are not inevitable partners. A review of the literature on computer equity reveals that many students--not only minority, disadvantaged, and inner-city, but also female, handicapped, and rural--have been hampered by inequitable access to microcomputers and by widespread patterns of inequitable distribution and use of microcomputers within and across schools. It is argued that limited hardware and software can in turn lead to scheduling patterns that favor higher-ability students. Other factors that can limit computer access to selected groups are also identified, including location of hardware in areas restricted to advanced students, setting unnecessarily difficult prerequisites for computer courses, lack of adaptive devices or special software for handicapped students, and software that incorporates stereotypes. Examples of research findings on computer equity for various categories of students are given, and it is concluded that active, committed involvement by equity advocates concerned about the needs of underserved groups is necessary to ensure equity with and through technology, especially as CD-ROM and online searching enter the curriculum. (17 references and 6 additional readings) (MAB)

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by

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Syracuse, New York

December 1991

IR053908

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Technology and Equity

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Introduction

Books and news stories regularly focus popular attention on inequities within our educational system. In about one-third of our states, lawsuits have sought or are seeking to remedy funding disparities correlated with lower achievement for students from poor communities. Concerns about our changing school population, the plight of our cities, and the perceived failures of public education have all fueled cries for educational reform that meets the needs of all our children.

Technology is routinely touted as a potentially powerful agent of that reform. For years, the microcomputer was cited as the vehicle for overcoming a wide array of inequities. Today, distance education approaches like teleconferencing, interactive television, electronic mail, and expanded telecommunications networks are promoted as avenues to improved resources for underserved students (Bruder, 1989). But despite the promise of emerging technology, it is important to remember that technology and equity are not inevitable partners.

Computers and Equity

The literature on computer equity reveals that many students—not only minority, disadvantaged, and inner-city but also female, handicapped, and rural—have been hampered by inequitable access to computers and by widespread patterns of inequitable distribution and use of computers within and across schools (Anderson, Welch, & Harris, 1984; Ascher, 1984; Becker, 1986; Hayes 1986; Urban, 1986). Problems begin at the "counting" level, with wealthy districts having a 54:1 student-computer ratio and poor ones having a ratio of 73:1 (Hood, 1985).

Limited hardware and software can in turn lead to scheduling patterns that limit the numbers and types of students who have access to computers. Becker and Sterling (1987) reported that "better" students use computers more than either average or slower students in elementary, middle, and, especially, high schools. Further, Becker (1987) noted that at all school levels, the most exciting computer opportunities are disproportionately available to students with the highest abilities; low achieving, high risk students, particularly in high school, are less likely to be in classes in which these opportunities occur. While these conclusions stem from data collected in 1985, preliminary analysis of data collected in 1989 shows only modest changes in schools' overall patterns of hardware and software use (Becker, 1990).

Factors other than sheer numbers can also limit computer access to selected groups. Locating hardware in labs and classrooms restricted to advanced students and setting unnecessarily difficult prerequisites for computer courses can easily deprive average and slower students of computer opportunities. Handicapped students can be withheld from computer opportunities by lack of adaptive devices, special software, or information about how to adapt regular software.

Finally, software that incorporates stereotypes and uses of technology that reflect subtle biases can create the most pernicious inequities of all. "Drill and kill" programs heighten the "masculinity" of both math and computers, thus reinforcing girls' frequently negative attitudes towards both (Collis, 1987). Economically disadvantaged students, who often use the computer for remediation and basic skills, learn to do what the computer tells them, while more affluent students, who use it to learn programming and tool applications, learn to tell the computer what to do (Watt, 1982).

Within the literature on computers and equity, authorities often concentrate on problems and solutions for individual categories of students. Gender equity has been the focus of considerable research (see, for example, Linn, 1985).*The Neuter Computer* (Sanders & Stone, 1986), a resource guide and teaching manual for fostering increased computer competence by female students and adults, is one of the many programs and publications directed at this audience. The Council for Exceptional Children sponsors the Center for Special Education Technology, which focuses on technological equity for students with physical, sensory, and learning handicaps. Both Apple Computer and IBM support units about adaptive technology and special software for students with physical and other disabilities. The Educational Computer Consortium of Ohio has sponsored over forty projects for minority and disadvantaged students, girls, and disabled students. The results of these projects have been compiled in *Yes, I Can*, a handbook that deals with policy and applications for these groups (Fredman, 1990). EQUALS in Computer Technology, a project originally created to enhance gender equity, offers *Off & Running*, a book of pre-computer activities designed to prepare all students, particularly girls and minorities, to seek computer time and profit from it (Erickson, 1986).

While each category of students embodies equity problems that merit specific attention, many of the concerns and techniques cited within individual segments of the literature apply across categories. The central recommendations—gaining awareness of the scope and

complexity of the issues and taking active steps to promote equity for the group in question—are found in the literature for all groups. Creating positive attitudes toward technology so that underserved students understand its relevance to them is a basic theme that runs throughout the literature. Finally, the need for active, committed involvement by equity advocates concerned about the needs of underserved groups is also necessary to ensure equity with and through technology (Neuman, 1990). Inequity often results from oversight rather than intent, and sensitivity to the danger of excluding some students from technology's opportunities can prevent many of the problems documented in the extensive literature on this topic. As CD-ROM and online searching enter the curriculum, vigilance will be especially necessary to provide all student groups with the benefits of electronic information resources.

Conclusion

Technological equity is a complex issue that encompasses disparities in access to and uses of powerful learning tools because of differences in socioeconomic status, gender, ability level, racial and ethnic identification, geographic location, and handicapping condition. Each of these areas has its own problems, research community, and suggested solutions. What the areas share is a need for unremitting attention. Only when all students are routinely granted access to hardware and to appropriate software, and only when technology is used to help each student achieve his or her own personal best, can we speak of technology and equity as partners.

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This digest was prepared with funding from the Office of Educational Research and Improvement, U.S. Department of Education, under contract no. RI88062008. The opinions expressed in this report do not necessarily reflect the positions or policies of OERI or ED.